

Profile

Robert Clarke retired in 2010 as a sergeant from the Atlantic City Police Department with twenty-five years of service. The last twelve years, he was assigned to the Traffic Unit and supervised the Crash Investigators and Motorcycle Officers and 120 civilians.

Mr. Clarke has over 1,420 hours of crash related training and completed the basic and advanced levels offered. He was the lead investigator for the Atlantic County Fatal Response team and personally assisted with over 150 fatal/serious crashes that range from mapping the scene to comprehensive analysis reports.

Mr. Clarke is currently an academic specialist with Kean University, for whom he teaches Crash Investigation 1 & 2 and Vehicle Dynamics levels of training (NorthWestern Univ.). He is the vice-president of New Jersey Association of Accident Reconstructionists (NJAAR) and holds full accreditation as a traffic accident reconstructionist from the Accreditation Commission for Traffic Accident Reconstruction (ACTAR).

Mr. Clarke holds a Bachelors Degree in Criminal Justice from Richard Stockton College and is a graduate of West Point Command and Leadership program.

Mr. Clarke is married to Lisa of sixteen years and has two children, Brielle (13 yoa) and Victoria (10 yoa) and currently resides in Galloway Township, NJ.

**Key Skills/
Certifications**

<i>-Instructor/Beta Testor Cad Zone</i>	<i>-Radar Instructor</i>	<i>-Instructor for LTI's Laser</i>
<i>-Instructor for Police Training</i>	<i>-Drug Recognition</i>	<i>System</i>
<i>Commission</i>	<i>Expert</i>	<i>-Police Traffic Control</i>
<i>-CDR Technician & Analyst</i>	<i>-Breathalyzer/ Alco</i>	<i>Technician</i>
	<i>test Operator</i>	

**Law
Enforcement
Experience**

02/11/99 to 9/1/10 – Sergeant, Traffic Unit. Supervised sworn officers (Crash Investigators & Motorcycle Officers) and 120 civilians that included the Towing, Parking Enforcement, Paint & Sign Shop, Traffic Control Officers and Crossing Guards Divisions. Other duties included coordination of speed and D.W.I. enforcement, grants, certifications of speed and D.W.I. equipment and review all crash and D.W.I investigations.

01/11/98 to 02/11/99 – Sergeant, Special Investigation Unit. Supervised Narcotic officers.

08/27/97 to 01/11/98 – Sergeant, Patrol. Supervised 4-12 shift officers.

08/29/97 – Promoted to rank of Sergeant.

07/08/91 to 08/29/97 – Detective, Prostitution Unit.

08/28/88 to 07/08/91 – Detective, Vice Unit.

01/03/88 to 08/28/88 – Police Officer, 12-8 shift.

12/13/85 to 01/03/88 – Police Officer, Safe Streets

07/19/85 to 12/13/85 – Basic Police Academy

**Recognition/
Awards**

During my career I was awarded one Exceptional Service Award, four Meritorious Service Awards, three Life Saving Awards and eighteen Commendations.

**Professional
Memberships**

Since 2001, member of New Jersey Association of Accident Reconstructionists (NJAAR). Member #292 and currently Vice President.

Since 10/28/02, full accreditation as a traffic accident reconstructionist from the Accreditation Commission for Traffic Accident Reconstruction (ACTAR). Member #1299.

Since 2003, member of the National Association of Professional Accident Reconstructionist Specialists (NAPARS). Member #22138.

Since 2007, member of the National Association of Traffic Accident Reconstructionists and Investigators (NATARI). Member #455.

References

Frank Volpicella, President of NJAAR – P.O. Box 8138 Bridgewater NJ 08807

Email – retvolpe@aol.com

John Daily, Jackson Hole Scientific Investigations – 95 Nelson Drive Jackson WY 83001

Email – john@jhscientific.com

Nathan Shigemura, Traffic Safety Group – 7610 Roberts Road New Berlin IL 62670

Email - www.trafficsafetygroupllc.com

Crash Related Training

- Basic**
- Accident Investigation Level 1 – Northwestern University, 4/26/99 to 5/7/99
 - Accident Investigation Level 2 – Northwestern University, 1/24/00 to 2/4/00
 - Vehicle Dynamics – Northwestern University, 5/1/00 to 5/5/00
 - Traffic Crash Reconstruction – I.P.T.M., 5/13/02 to 5/24/02
- Specialty**
- Motorcycle Crash Investigation – I.P.T.M., 6/10/02 to 6/14/02
 - Traffic Engineering for Police Officers – Rutgers University, 9/9/04 to 11/15/04
 - Laser Technology Course – LTI, 5/13/05 to 5/14/05
 - Basic Crash Zone Training – Anna Ristau, 10/4/05, 2/28/06 & 10/23/07
 - Advanced Crash Zone Training – Anna Ristau, 3/1/06 to 3/3/06
 - Acceleration & Vericom Course – Vericom Computers, Version 3 – 3/27/06 to 3/28/06
Version 4 – 6/29/10 to 6/30/10
 - Pedestrian/Bicycle Crash Investigations – I.P.T.M., 5/15/06 to 5/19/06
 - Crash Data Retrieval System Technician & Analyst – Version 2.8 – 10/17/06 to 10/20/06
Collision Safety Institute Version 3.2 – 5/18/09 to 5/22/09
 - Commercial Vehicle Inspection & Investigations – I.P.T.M., 3/24/08 to 3/28/08
 - Momentum Course – Gloucester County Academy, 11/17/08 to 11/19/08
 - Investigation & Prevention of Police Officer Crashes – Seatac WA., 1/26/09 to 1/27/09
 - Laser Scene Mapping Course – I.P.T.M., 4/27/09 to 5/1/09
 - Digital Photography – Gloucester County Academy, 5/8/09
 - Forensic Mapping Class – MATAI, 10/5/10
 - Occupant Kinematics in Reconstruction – I.P.T.M., 1/10/11 to 1/14/11
- Advanced**
- Advanced Traffic Engineering for Police Officers – Rutgers University 1/13/05 to 3/24/05
 - Traffic Crash Reconstruction Update – I.P.T.M., 4/3/06 to 4/7/06 & 8/27/07 to 8/31/07
 - Energy Methods & Damage Analysis in Traffic Reconstruction – I.P.T.M., 6/11/07 to 6/15/07 & 9/20/10 to 9/24/10
 - Advanced Traffic Crash Reconstruction WinCrash – I.P.T.M., 3/3/08 to 3/7/08
 - Applied Physics Crash Investigations – I.P.T.M., 9/8/08 to 9/12/08 & 3/8/10 to 3/12/10
 - Advanced Commercial Vehicle Crashes – I.P.T.M., 4/5/10 to 4/9/10
 - Advanced Pedestrian/Bicycle Crash Investigations – I.P.T.M., 5/24/10 to 5/28/10
- Conferences**
- 2002 Annual Conference – Ocean City MD, NAPARS – 9/9/02 to 9/13/02
 - 2003 Annual Conference – Atlantic City NJ, NJAAR – 9/30/03 to 10/3/03
 - 2004 Annual Conference – Ocean City MD, MATAI – 10/6/04 to 10/8/04
 - 2005 Annual Conference – Wilmington DE, NATARI – 10/4/05 to 10/7/05
 - 2006 NJAAR Conference – Middlesex County NJ – 9/7/06 to 9/8/06
 - 2007 Annual Conference – Binghamton NY, NYSTARS – 10/24/07 to 10/26/07
 - 2008 Pennsylvania State Police Conference – State College PA – 9/30/08 to 10/2/08
 - 2008 Annual Conference – Atlantic City NJ, NJAAR – 10/13/08 to 10/17/08
 - 2009 Pennsylvania State Police Conference – State College PA – 9/29/09 to 10/1/09
 - 2009 Annual Conference – Ocean City MD, NAPARS – 10/7/09 to 10/9/09
 - 2010 Annual Conference – Ocean City MD, MATAI – 10/5/10 to 10/8/10
- Other Training**
- DWI/HGN Course – N.J.S.P., 5/2/94 to 5/6/94
 - Interview & Interrogation Course – F.B.I., 5/13/95 to 5/14/95
 - Drug Investigation Course – U.S. Army, 2/5/96 to 2/9/96
 - Police Supervision Course – N.J.S.P., 9/23/96 to 10/4/96
 - Financial Investigative Techniques Course – I.R.S., 2/25/98 to 2/27/98
 - Drug Commanders Course – U.S. Army Fort McCellan AL, 5/25/98 to 5/29/98
 - Surveillance & Investigative Technology Course – D.C.J. 8/4/98 to 8/7/98
 - Managing Generation X – I.A.C.P., 3/18/02 to 3/19/02
 - Drug Recognition Expert training – N.H.T.S.A., 4/29/02 to 5/10/02
 - NJTR-1 Form Training – Rutgers University, 12/13/05
 - Supervising the Police Motorcycle Unit – Bergen County NJ, 4/25/05
 - Methods of Instruction – Cape May Police Academy, 3/6/06 to 3/10/06
 - West Point Command & Leadership – N.J. Chief of Police, 8/16/06 to 12/8/06

Course Descriptions/Scope

Basic Training

Accident Investigation Level 1 – Traffic Crash Investigation 1 introduces the concept of investigating crashes rather than just reporting them. The most valuable information in determining how a crash occurred is available at the crash scene. The investigator must know both what evidence to collect and how to collect it. Documentation of the scene through knowing what to measure and how to map it is also a key part of this class. The Center's expert instructors present lectures and demonstrations and supervise practical work projects in class and in the field.

Northwestern University, 4/26/99 to 5/7/99 – 80 hours

Accident Investigation Level 2 – Traffic Crash Investigation 2 builds on what was presented in Traffic Crash Investigation 1. While the primary focus of Traffic Crash Investigation 1 is on the identification and collection of evidence at the crash scene, the focus of Traffic Crash Investigation 2 is more on the interpretation and analysis of crash-related evidence. Some topics include: vehicle damage analysis, vehicle behavior in accidents, results of the accident on the road, lamp filament analysis, tire damage analysis, measurement methods, and specialized data gathering.

Northwestern University, 1/24/00 to 2/4/00 – 80 hours

Vehicle Dynamics – Vehicle Dynamics introduces students to the laws of physics and mechanics that relate to motor vehicle collisions. The classroom instruction and use of case studies prepares students to continue their education in various crash reconstruction classes.

Northwestern University, 5/1/00 to 5/5/00 – 40 hours

Traffic Crash Reconstruction – This course will further your understanding in vehicle dynamics. You will take part in a more intense study of time/distance calculations, angular momentum and impact speed calculations using momentum equations. This course includes extensive project work and controlled vehicle experiments to give you firsthand experience in crash reconstruction. Each student will be required to diagram and analyze three different crash scenarios as well as complete vector sum analysis of each.

Topics include:

- Derivation and origin of the commonly used speed formulas
- Speed of vehicles at impact using conservation of linear momentum
- Behavior of vehicles in a collision using Newton's three laws of motion
- Discussions of commercial vehicle and motorcycle dynamics in collisions
- The determination of direction of travel, initial contact and position of vehicles on the roadway.

I.P.T.M., 5/13/02 to 5/24/02 – 80 hours

Specialty Training

Motorcycle Crash Investigation – This course is designed for experienced traffic crash investigators who have a good working knowledge of the techniques and applications of formulas taught in basic crash investigation courses and who wish to build upon that foundation with more advanced mathematical formulas used to analyze motorcycle crashes. Various field tests will be conducted showing you a variety of motorcycle skids, accelerations and slide-to-stop drag factors. You will learn how to photograph skids and examine the subsequent effects that skids have on the tires and surfaces. Through these tests, you will gain valuable first-hand experience that can be beneficial in court proceedings. You will be given a manual of applicable information to use as a motorcycle reference book.

Topics include:

- Analyzing and interpreting the motorcycle crash scene
- Determining acceleration and deceleration characteristics of the motorcycle
- Analyzing and interpreting modes of instability and handling characteristics in motorcycles
- Interpreting the operator factor
- Reviewing motorcycle tires, helmets and other equipment
- Using a practical application of formulas (projects)

I.P.T.M., 6/10/02 to 6/14/02 – 40 hours

Traffic Engineering for Police Officers – The Basic Traffic Engineering course is for the Police Traffic Officer responsible for conducting traffic investigations and making recommendations to supervisors, local government officials, and engineering departments concerning the need for installing or reviewing traffic control devices. Covered are: general traffic engineering principles; determining the need for traffic control devices; traffic signal design and operation; design of proper pavement markings; type, design and placement of regulatory, warning, and guide signs; traffic controls in construction and maintenance work areas, and school zones; and procedures for drafting and adopting ordinances and resolutions.

Rutgers University, 9/9/04 to 11/15/04 – 33 hours

Laser Technology Course – Specific instruction in the use of laser-based devices, featuring Laser Technology, Inc units, for measuring evidence at crash scenes and downloading that information into mapping software.

Randy Tange LTI, 5/13/05 to 5/14/05 – 16 hours

Basic Crash Zone Training – Specific instructions in the use of the Crash Zone CAD drawing program, includes the overview of all functions.

CADZone-Anna Ristau, 10/4/05, 2/28/06 & 10/23/07 – 24 hours

Advanced Crash Zone Training – Specific instructions in the advanced functions of the Crash Zone CAD drawing program, includes reconstruction, 3D and animation functions.

CADZone-Anna Ristau, 3/1/06 to 3/3/06 – 21 hours

Acceleration & Vericom Familiarization Course – The following topics will be taught;

- *Deceleration (skid friction test):* Actual braking testing to measure drag factor speed, time and distance. Each person will have an opportunity to operate a vehicle in a panic braking situation and/or operate the Vericom during the skid test.
- *Coefficient of friction:* Explanation and demonstration of static friction, peak friction, slip friction, sliding friction.
- *Braking systems:* Comparing standard brakes & ABS.
- *Acceleration:* from a STOP and from a known velocity.
- *Gradient and Superelevation:* How to measure grade.
- *How to present the Vericom in a court of law:* Acceptance of technology and calibration.
- *Demonstration and training on Profile software, graphic and displaying data.*
- *Analyzing the deceleration curve.*
- *Creating a paper trail for a courtroom presentation.*
- *Using the Vericom to prove your hypothesis.*
- *Demonstrating your theory.*
- *Lateral acceleration:* How to measure and when to apply lateral G.

- *Measuring brake pedal pressure.*
 - *Measuring reaction time.*
 - *Measuring air pressure.*
 - *Introduction of the OBDII connector interface to the Vericom.*
 - *Measuring low speed impacts with an accelerometer.*
 - *Application of multi axis accelerometer.*
- Vericom Computers, Version 3 – 3/27/06 to 3/28/06 – 13 hours*
Vericom Computers, Version 4 – 6/29/10 to 6/30/10 – 12 hours

Pedestrian/Bicycle Crash Investigations – Pedestrian and bicycle crashes are one of the most frequent types of injurious crashes in urban areas. Because of their unique nature, special techniques are required to investigate and reconstruct these incidents. This course addresses the special dynamics involved in pedestrian and bicycle traffic crashes. From reaction times to victim injury analysis to environmental factors, you'll learn to recognize and interpret the evidence and correlate it with the collision sequence. In addition to classroom instruction, practical exercises and staged crash situations will be used to give you "hands-on" experience.

Topics include:

- Pedestrian crash problems
- Pedestrian impact dynamics
- Types of data: objective, subjective and performance
- Collection of data
- Pedestrian conspicuity
- Reaction time/human factors
- Reconstruction techniques
- Bicycle collision analysis
- Hit and run investigation techniques

I.P.T.M., 5/15/06 to 5/19/06 – 40 hours

Crash Data Retrieval System Technician & Analyst – This course offers the collision reconstructionist who has completed the basic CDR Technician Course further insight into the function of the automobile Event Data Recorder (EDR) function or subcomponent, its history and evolution as well as an expanded interpretation skills enabling the application of a Bosch Crash Data Retrieval (CDR) System report to a situationally complete crash reconstruction. Using traditional reconstruction techniques such as momentum applications, an understanding of delta-V and PDOF and typical admissibility hearing issues as the general basis for the course objectives, the CDR Data Analyst Certification course is both a natural extension of the CDR Technician training and an expansion of one's reconstruction skills. There is no hands on "downloading" activity in this class since it is assumed that those in attendance have recently completed the Technician course and understand that process along with the underlying concepts of data storage in the EDR subcomponent, CDR software troubleshooting and related error messages and their solution(s). For that reason, there is no need to bring a CDR System to this course. Activity in this course is focused on reading and understanding a CDR report then applying it to a normal, situationally complete reconstruction.

Major course topics include:

- Crash pulse data recording strategies
- Delta-V reporting strategies
- Integral calculus applications for recorded crash pulse data
- Airbag control module basics (components and functionality)
- Airbag deployment decision making basics
- CDR System software function (hexadecimal data to plain language and CDR report format basics)

Chrysler, Ford & General Motors airbag control and powertrain module data

- Commonalities
- Nuances
- Data from testing to illustrate reliability
- Exercises: crash pulse data analysis, integral calculus applications and the relationship between delta-V and "pre-crash data"

- Evaluating and graphing PCM data
- Data from MY2008 and newer modules which require the ACM adapter for direct-to-module imaging
- Exercises: Relating PCM data to "impact" and delta-V data to "pre-crash data," evaluating
- Engineering Translation Report applications
- Rollover Sensor relationship to ACM (SDM) data
- Data from MY2010 and newer modules which include internal rollover sensing
- Exercises: Using MY2006 and newer longitudinal and lateral data to evaluate PDOF, comparing CDR report PDOF to a reconstruction based PDOF
- Basics of data not currently available using the CDR System
- A review of publically available data not recovered using the Bosch CDR system

Collision Safety Institute, Version 2.8 – 10/17/06 to 10/20/06 – 40 hours

Collision Safety Institute, Version 3.2 – 5/18/09 to 5/22/09 – 40 hours

Commercial Vehicle Inspection & Investigations – This intensive course will cover the unique characteristics of commercial motor vehicles and the special dynamics at play when one is involved in a collision. Detailed information of the nomenclature and operation of commercial motor vehicles will provide you with a level of competence needed to perform an adequate post-crash inspection of the vehicle. To reinforce the concepts presented, you will conduct “hands-on” exercise inspections and vehicle testing during the course. *Topics include:*

- Tractor-trailer nomenclature
- Brake systems: configuration and operation
- Wheels, rims and tires
- Steering suspensions and frames
- Trailer coupling devices - fifth wheels
- Tachograph charts - log books
- Vehicle inspections
- Center of mass determinations
- Skid mark measurements and speed analysis
- Jackknifing
- Hydroplaning
- Rollover
- Vehicle dynamics in braking
- Weight shifting

I.P.T.M., 3/24/08 to 3/28/08 – 40 hours

Crash Investigations Using Momentum Analysis – This class builds upon the students prior Advanced Traffic Crash Investigations. Students will take part in a more intense study of time/distance calculations, angular momentum and impact speed calculations using Momentum equations .

Gloucester County Academy, 11/17/08 to 11/19/08 – 24 hours

Investigation & Prevention of Police Officer Crashes – This two-day course identifies the key components of an effective crash prevention program. Officer involved collisions are not “a cost of doing business”. These tragedies can be prevented with proper training, supervision, and investigation. The material is presented through the use of scenarios that replicate current case law and real collisions.

Discussion Topics Include:

- Emergency Vehicle Operation Training
- Safer Traffic Stops & Traffic Control
- Emergency Vehicle Equipment
- Human Factors

- Crash Data Retrieval Technology
- Officer Involved Collision Case Law Update
- Criminal vs. Civil vs. Internal Investigations
- Civil Liability Issues & Settlement Agreements
- Officer Rights and Union Representation
- Administrative Procedures

Mait.us, Seatac WA., 1/26/09 to 1/27/09 – 16 hours

Laser Scene Mapping Course – This course will teach you how to use any laser mapping equipment, including speed lasers and total stations, to determine scene dimensions for later renderings in scale diagrams. You will learn about coordinate geometry and the various methods for conducting accurate scene measurements, from tape measuring to the latest laser mapping systems. You will be shown the proper procedures for setting-up, testing, and operating the laser mapping devices and how to download the resulting data. And you will take part in a number of “hands-on” exercises which involve locating and measuring evidence in a variety of field conditions using the laser mapping equipment. You will also receive an introduction on computer diagramming software and how to render a scale drawing of a scene.

Topics include:

- Overview of laser measuring
- Coordinate geometry and measuring
- Introduction to laser mapping equipment
- Proper methods of at-scene measuring
- Relocating systems while measuring
- Introduction to computer diagramming
- Downloading data and rendering a scale diagram

I.P.T.M., 4/27/09 to 5/1/09 – 40 hours

Digital Photography – This “hands-on” course addresses the unique characteristics of crash scene photography and will teach you how to properly photograph a crash scene. “Hands-on” exercises photographing crash scenes and wrecked vehicles will accompany class lectures to give you a thorough working knowledge of your camera’s component parts and accessories.

Gloucester County Academy, 5/8/09 – 8 hours

Forensic Mapping Class – This class was offered at the 2010 annual joint crash conference. It addressed legal issues, advanced mapping issues using maps, “RAW” data, and the history.

MdATAI Conference, 10/5/10 – 7 hours

Occupant Kinematics in Reconstruction – This course will teach you how to recognize and interpret traffic crash evidence as it relates to occupant seating positions. Students will be shown how to determine the occupant movement from the crash damage and subsequent injuries that resulted. Basics of occupant movement will be illustrated and officers will learn how to ascertain the direction of movement during a collision. Students will learn how to determine occupant seating position and safety belt usage and examine the significance of airbag and other restraint deployments. Officers will also learn to read medical records that can be obtained with a warrant as well as autopsy reports of the injuries sustained by the vehicle’s occupants so they can understand how they related to the investigation. When correlated with vehicle damage, these reports can provide further evidence of occupant positions and movement. Actual crashes will be used as case studies.

I.P.T.M., 1/10/11 to 1/14/11 – 40 hours

Advanced Traffic Engineering for Police Officers – This course is for those who have already completed the Basic course. It is designed for the police traffic officer responsible for conducting traffic investigations & inspecting traffic control installations; planning boards; engineering departments; and other local government officials concerning general traffic engineering principles. The course covers: construction plan reading; traffic generation issues for new developments; general geometric design criteria; intersection & roadway capacity analysis; speed studies; accident analysis & summaries; general traffic flow characteristics; and the impact of the aging population on highway safety.

Rutgers University 1/13/05 to 3/24/05 – 33 hours

Traffic Crash Reconstruction Update – This course provides the latest theories and methodologies of crash reconstruction and expands your knowledge of the principles of collision analysis. Much more than “just a refresher” class, we will present topics that have previously received limited coverage as well as many new ones. We will review the mathematical equations that are used in conjunction with crash data to interpret how a collision occurred. Emphasis will be placed upon skid characteristics, spin analysis, critical speed yaw analysis and friction. The concepts of time-distance, uniform circular motion, pole impacts, conservation of linear momentum and using simultaneous equations to solve inline collisions are just a few of the topics that will be covered. As part of the course, you will be required to complete several in-class projects and a comprehensive, multi-disciplinary project designed to reinforce the class material.

Topics include:

- Geometry, trigonometry and selected mathematical topics
- Dynamics and Newton’s Laws of Motion
- Skid analysis and testing
- Critical speed yaw analysis
- Time-distance analysis
- Concepts in rotational mechanics
- Pole and narrow object impacts
- Conservation of linear momentum
- Fundamentals of rollover crash reconstruction
- Uniform projectile motion and airborne speed analysis

I.P.T.M., 4/3/06 to 4/7/06 & 8/27/07 to 8/31/07 – 80 hours

Energy Methods & Damage Analysis in Traffic Reconstruction – This course will help de-mystify the concept of energy and present energy-based methods and techniques to use in analyzing traffic crashes. During the course, you will learn to view and analyze crashes from an energy point of view. We will explore energy methods beginning with the basics and progressing to more advanced concepts. We will discuss the often-misunderstood topics of Equivalent Barrier Speed (EBS) and delta-V and you will learn different ways to analyze collisions, such as damage momentum, where a traditional conservation of linear momentum may not be the most appropriate analysis. We will also explore the topic of crush. We will examine the basis of the three familiar energy equations that use crush measurements. Outside projects will provide you with “hands-on” experience in examining and measuring crash vehicles and then calculating damage energy and speeds. This course will help you become more comfortable in utilizing energy-based methods in your analysis as we examine the underlying science that computer-based “crash” programs rely upon. It is an excellent complement to other training courses that teach you how to use “crash” software. You should have a firm understanding of the topics of traffic crash

reconstruction and conservation of linear momentum as well as strong basic math skills.

Topics include:

- Standards, measurements and dimensional analysis
- Understanding and using conversion factors
- Vectors
- Damage momentum and crush analysis
- Crush measuring protocol and measuring techniques
- Outdoor project - interpreting damage and measuring crush
- Energy concepts and analysis
- Determining appropriate post-impact drag factors
- Understanding EBS and delta-V
- Conservations of linear momentum and delta-V vectors
- Introduction to crush and Hooke's Law
- Collision analysis using damage momentum
- Understanding and determining stiffness coefficients
- Damage (crush) analysis
- Pole impacts and fracture energy
- Using simultaneous equations to solve in-line collisions

I.P.T.M., 6/11/07 to 6/15/07 & 9/20/10 to 9/24/10 – 80 hours

Advanced Traffic Crash Reconstruction WinCrash – This course will teach you how to use the *Win-Crash*[®] computer software and apply it to all phases of your reconstruction. Numerous “hands-on” exercises utilizing the software will help you become proficient with its use. We will explain how the program can provide you with the ability to analyze any and all of the variables that affect impact speed analysis. In addition, we will discuss, in detail, post-impact trajectories, common velocity issues, spin analysis, and collision force balancing. *WinCrash*[®] is state-of-the-art crash reconstruction software designed to build upon your understanding of linear momentum and crush analysis in the determination of impact speeds. The momentum analysis will determine impact speeds based upon initial and final impact positions and the trajectory of the vehicle during its post-impact phase to its position of final rest. The energy analysis will determine impact speeds based upon damage and the application and direction of the collision forces during the collision phase of the traffic crash.

I.P.T.M., 3/3/08 to 3/7/08 – 40 hours

Applied Physics for the Crash Investigations – This course will provide you with a more thorough understanding of the physics that are applied in the reconstruction of a traffic crash or any other incident where motion is involved. While some of the topics discussed in the course are introduced in basic crash investigation and reconstruction courses, they will be given significantly more in-depth coverage in this course. In addition, Applied Physics for the Traffic Crash Investigator will prepare you for the concepts presented in advanced reconstruction courses using computer modeling.

Topics include:

- Math overview
- Work-energy relationships and applications
- Conservation of linear momentum/impulse (with vector sum analysis using mathematical and graphical methods)
- Uniform projectile motion/airborne equations
- Uniform circular motion/critical speed
- Tire forces and tire mark evidence
- Time-distance relationships
- Energy loss in collisions/CRUSH
- Rotational mechanics/rotation after collision and pitch down in take off

- Low-speed collision considerations including coefficient of restitution

I.P.T.M., 9/8/08 to 9/12/08 & 3/8/10 to 3/12/10 – 80 hours

Advanced Commercial Vehicle Crashes – This course is designed to further enhance the knowledge and skills you acquired in IPTM’s *Inspection and Investigation of Commercial Vehicle Crashes* course. You will learn how to conduct a detailed analysis of commercial motor vehicle dynamics and its application to traffic crash reconstruction. During this course, you will analyze the ABS air brake system by conducting tests to determine average air chamber pressure. You will also be shown how to determine the limits of axle weights based upon the location of center mass, as well as static-quasistatic and dynamic roll propensities.

Topics include:

- Kinetic energy - determining delta-V in central impacts
- ABS - Air Brake Systems
- Speed analysis using gear reduction ratios
- Low speed - high speed off-tracking
- Dynamic roll propensities
- Axle weight distribution - using equilibrium and free body diagrams
- Liquid load analysis

I.P.T.M., 4/5/10 to 4/9/10 – 40 hours

Advanced Pedestrian/Bicycle Crash Investigations – This course will provide you with the latest theories and methodologies of pedestrian/bicycle traffic crash investigation. Building upon the topics presented in IPTM’s *Pedestrian/Bicycle Crash Investigation*, our focus during this advanced class will concentrate on the analysis of the collision. We will show you how to develop a systematic approach to these types of collisions so that you can gather all of the critical information necessary to conduct your analysis. The origins of the equations that were developed to analyze both impact speed and pedestrian/cyclist motion as a result of the collision will be explored. We will also discuss the effects of vehicle design on the pedestrian/cyclist’s injuries and movements. During the class, actual crash tests will be performed to help you understand the overall pedestrian/cyclist analysis. To help you complete your investigation, we will show you how to use the PEDBIKE 2000 Plus[®] software. This software contains many of the commonly used formulae needed by investigators and will be provided to each student to keep.

Topics include:

- Pedestrian/cyclist impact dynamics
- The effects of vehicle design on pedestrian/cyclist injuries and movement
- The origin of basic equations developed to analyze impact speed in pedestrian/cyclist involved collisions
- The origin of equations used to analyze pedestrian/cyclist motion as a result of a collision
- The development of a systematic approach to pedestrian/cyclist collision investigation
- Instruction on the use of the PEDBIKE 2000 Plus[®] software
- Real world case analysis
- Crash testing to assist in the overall pedestrian/cyclist analysis

I.P.T.M., 5/24/10 to 5/28/10 – 40 hours

Accident Investigation Level 1 – Vineland Police Academy 04/23/07 to 04/27/07
 Accident Investigation Level 1 – Richard Stockton College 05/12/08 to 05/23/08
 Accident Investigation Level 1 – Richard Stockton College 05/03/10 to 05/14/10
 Accident Investigation Level 1 – Monmouth County Police Academy 05/18/10 to 05/20/10
 Accident Investigation Level 2 – Sea Girt NJSP 03/21/11 to 04/01/11

**Crash Classes
Taught**

Vehicle Dynamics – Atlantic County Police Academy 04/13/09 to 04/17/09

Basic CADZone – Atlantic City PD 06/10/08 to 06/11/08

Basic CADZone/LTI – Atlantic County Police Academy 02/24/09 to 02/27/09

Basic CADZone/LTI – Atlantic County Police Academy 12/14/09 to 12/18/09

Basic CADZone/LTI – NJSP Buena 04/04/11 to 04/08/11